

Conduct Air Quality Analysis

Project Development and
Environmental Analysis Branch



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Version 1

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Purpose

The purpose of this procedure is to evaluate air quality impacts of transportation facilities and determine if a given project meets the NAAQS (National Ambient Air Quality Standards). Where documentation requirements call for an Environmental Impact Statement (EIS) on the project, an air quality study is required regardless of the project's location.

Background

The primary purpose of the Traffic Noise/Air Quality Section is to provide expertise in the area of technical data collection, evaluation and prediction of highway related air quality impacts. All projects are reviewed to ensure compliance with Federal and State regulations pertaining to highway air quality. The guideline documents for the highway air quality analysis are 40 CFR Parts 51 and 93, 15 NCAC 2D .0520. The section also provides coordination and quality control for air quality studies undertaken by private engineering firms.

The air quality analysis includes the following:

1. Identification of the intersection(s) that is to be analyzed.
2. Prediction of air quality levels in the vicinity of the proposed alignments.
3. Determination of highway air quality impacts.
4. Examination and evaluation of highway air quality analysis.

Responsibility

It is the primary responsibility of the Air Quality Specialist within the Traffic Noise/Air Quality Section of the Human Environment Unit to conduct Air Quality Analyses.

Policy, Regulatory, and Legal Requirements

Federal Regulations:

- [NEPA – The National Environmental Policy Act](#)

- [National Ambient Air Quality Standards \(NAAQS\)](#)
- [Clean Air Act Amendments of 1990](#)
- [40 CFR 51- Requirements for Preparation, Adoption, and Submittal of Implementation Plans](#)
- [Interim Guidance on Air Toxic Analysis in NEPA Document](#)
- [Transportation Conformity Guidance for Qualitative Hot-spot Analysis in PM2.5 and PM10 Nonattainment and Maintenance Areas](#)

Scheduling and Time Constraints

The Air Quality Analysis should be submitted within 60 days from when the Project Development Engineer submits the request.

Procedures

Procedure Inputs:

- Request from Project Development Engineer for Air Quality Analysis
- If available, pertinent Reports, Studies and Surveys, such as Traffic Reports, Feasibility Studies, and Traffic Surveys
- Measurable map of 1:200 scale or larger of intersection(s) 1: 200 or larger.

Procedure Output – Air Quality Analysis report

The Air Quality Specialist will follow the steps below to properly conduct Air Quality Analyses.

Step	Action
1	Review request to determine validity and if needed documentation is included.
2	<p>Gather or develop project information needed for analysis:</p> <ul style="list-style-type: none"> • Environmental Input Request (EIR) • Specification of project type: new location or widening (symmetrical or right/left) • Evaluation years (usually completion years, five years after completion, and design year) • Appropriate mapping for measurements Mapping with intersection design details such as lane configuration. • Aerial photography • Traffic data –The Predicted AADT Traffic Diagram from the Roadway Design Project Manager includes the completion year, design year, anticipated right of way, anticipated speed limit, and truck percentage. This will be submitted in hard copy. • The Determination of Control of Access – Full or partial – verbal indication from the Roadway Design Project Manager or by project request. <p>Note: No formal public involvement is required by this procedure. All aspects of environmental concern are in the environmental documents presented during the project public hearing. Occasionally, staff from the Traffic Noise & Air Quality Group are asked in to help support staff during the public hearing.</p>
3	Determine the appropriate transportation conformity standard statement (s) for inclusion in the analysis.
4	Identify whether the project is within a CO non-attainment area to verify need for a CO

	"hot-spot analysis". If project is in CO attainment county, skip to Step 8. CO "hot-spot analyses" are required only for Durham, Forsyth, Mecklenburg and Wake Counties.
5	Identify worst-case signalized intersection along the project (i.e., intersection that carries the highest volume and / or the worst intersection LOS).
6	Determine phasing of the intersection on the Phasing Determination worksheet by sketching the traffic movements during each phase that will clear out the traffic efficiently.
7	Use Synchro software to determine average operating speeds and vehicle movements of the approach and departure links. Determine critical volume of the intersection using the Critical Volume Red/Green Time worksheet.
8	Use MOBILE 6.2 software to compute fleet vehicle emission rates for the intersection that carries the highest volume.
9	Compute CO emissions at identified locations by predetermining locations per Air Quality technical guidance along the proposed project using CAL3QHC software.
10	<p>Determine whether or not the project requires a PM "hot-spot analysis." A PM "hot-spot analysis" is an estimation of likely future localized PM_{2.5} or PM₁₀ pollutant concentrations resulting from a new transportation project, and a comparison of those concentrations to the relevant National Ambient Air Quality Standards (NAAQS). The hot-spot analysis must be completed for project-level conformity determinations for "projects of air quality concern" in PM₁₀ and PM_{2.5} non-attainment and maintenance areas. The Hot Spot analysis is a coordinated effort undertaken by special interest parties such as NCDOT, FHWA, DHNR, EPA etc. (See FHWA memo on Transportation Conformity Guidance for Qualitative Hot-spot Analysis in PM2.5 and PM10 Nonattainment and Maintenance Areas). PM_{2.5} "hot-spot analyses" are required for "projects of air quality concern" located in Catawba, Guilford and Rowan Counties.</p> <p>Note: If hot-spot analysis is not required, document that no new violations will be created and that the severity or number of existing violations will not increase as a result of the project.</p>
11	Determine level of MSATs (Mobile Source Air Toxics) documentation required using FHWA tiered approach guidance. (See Interim Guidance on Air Toxic Analysis in NEPA documents , dated February 3, 2006)
12	<p>Prepare and distribute report:</p> <ul style="list-style-type: none"> • Original Air Quality Analysis to the Project Development Engineer (hard copy and electronic) for inclusion into the Environmental Document. • Copy of Air Quality Analysis in the Traffic Noise & Air Quality Group files.

Warnings and Precautions

None

Resources and Tools

Computer: PC for using specialized programs, spreadsheets, and preparing reports

Software:

- HEU Traffic Computation Spreadsheet

- HEU Air Quality Spreadsheet
- MOBILE 6.2 (used to compute vehicle emission rates)
- Synchro Software (used to determine average operating speeds and vehicle movements)
- CAL3QHC (used to compute CO emissions for the entire project)
- EMIT software (Easy Mobile Inventory Tool, an add-on to MOBILE 6.2)
- Microstation® for reviewing plans

Reference books, guidebooks, memos:

- Challenges and Opportunities for Transportation Implementation of the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991-- published in "Transportation": An International Journal devoted to the Improvement of Transportation Planning and Practice
- A Guide to Metropolitan Transportation Planning under ISTEA: How the Pieces Fit Together
- A Summary: Air Quality Programs and Provisions of the Intermodal Surface Transportation Efficiency Act of 1991
- Transportation Planning Requirements of the Federal Clean Air Act Amendments (CAAA) of 1990: A Highway Perspective" – conference proceedings published in ASCII's Transportation Planning and Air Quality
- FHWA [Air Quality Guidelines for Environmental Documents](#)
- FHWA [Interim Guidance on Air Toxic Analysis in NEPA documents](#)
- [Transportation Conformity Guidance for Qualitative Hot-spot Analysis in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas](#)

Training:

Specialized training for using MOBILE 6.2 and MSAT is available through FHWA

- Air Quality Benefit Estimation Methodologies For CMAQ Projects
- Air Quality Fundamentals (101)
- Applied Mobile6.2 Modeling Workshop
- EMIT Modeling Workshop
- Project-Level Mobile Source Air Toxics (MSAT) Workshop
- Transportation Air Quality Dispersion Modeling Workshop

Contacts

- For suggestions to change this procedure contact: Greg Smith (919) 715-1607
- For questions about performing this procedure contact: Bobby Dunn (919) 715-1613

Glossary

Carbon Monoxide (CO)

Particulate Matter (PM) – Material suspended in the air in the form of minute solid particles or liquid droplets, (usually considered to be an atmospheric pollutant).

Environmental Impact Statement (EIS)

Hot-Spot Analysis – is an estimation of likely future localized PM_{2.5} or PM₁₀ pollutant concentrations resulting from a new transportation project, and a comparison of those

concentrations to the relevant National Ambient Air Quality Standards (NAAQS) (See 40 CFR 93.101).

Mobile Source Air Toxics (MSAT) – There are six priority MSATs (benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene).

National Ambient Air Quality Standards (NAAQS)

“Projects of Air Quality Concern” are projects within a PM₁₀ and/or PM_{2.5} non-attainment or maintenance area, funded or approved by FHWA or FTA, and are a type of project as defined in 40 CFR 93.123(b)(1)

User Access

Restricted NCDOT, FHWA, MPO, RPO, Consultants, etc.

Flowchart

None